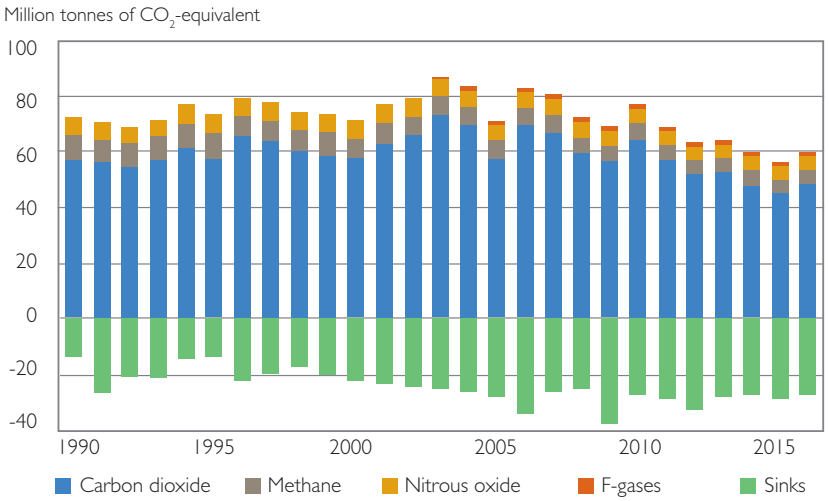
# Finland fights **climate change**

Total emissions of greenhouse gases (GHG) in Finland have declined from the record years of the early 21st century. In 2016 they were about 18% lower than in 1990. However, according to Statistics Finland, emissions in 2016 had grown six percent compared with the previous year. One of the main reasons was growth in the consumption of coal and a decline in the share of biofuels in transport.

**Finland's greenhouse emissions and the net carbon sink of the land use sector in 1990–2016**




Source: Statistics Finland. 2018.

Total emissions of greenhouse gases in 2016 were 58.8 million tonnes carbon dioxide equivalent, excluding emissions and carbon sinks in the so-called LULUCF sector, linked with land use, land use change, and forestry. The greatest emissions are caused by energy production and consumption. In 2016, 75 percent of total emissions were from the use of fossil fuels. Industrial processes, the use of products, and agriculture cause about 11 percent of all emissions. Waste management accounted for 3 percent of emissions. Emissions from waste management have declined evenly from the early 1990s thanks to improvements in waste management.

Forests are an important carbon sink and the relative importance of forests as a carbon sink is greater than is generally the case in EU countries. The annual carbon sink level of our forests varied from 20 to 50 million tonnes of carbon dioxide between 1990 and 2015, especially depending on the amount of felling. At its lowest it corresponded to about one third, and at its highest it was up to about a half of Finland's greenhouse gas emissions. Changes in the forest carbon sink and in carbon stored in wood products are monitored annually, as is the case with emissions from other types of land use. The annual carbon sink of wood products calculated in Finland's emission balance was on average about five million tonnes of carbon dioxide from 1990 to 2015, while other land use caused an average 10 million tonnes of greenhouse emissions. The entire LULUCF sector was a carbon sink equivalent to an average of about 27 million tonnes of carbon dioxide from 1990 to 2015.

## Forest carbon sink affects net emissions

In EU climate obligations the development of greenhouse gas emissions and carbon sinks are followed in three different sectors, which are the emissions trading sector, the so-called effort sharing sector, concerning GHG emissions not included in the EU Emission Trading System EU ETS), and the LULUCF sector. The EU ETS has the same GHG emission target for the entire EU, whereas the Effort Sharing legislation establishes binding annual greenhouse gas emission targets for Member States. GHG emission targets of the effort sharing sector vary from country to country and Finland's target is that these emissions should be 39% smaller by 2030 compared to 2005. Emissions of the LULUCF sector will be regulated for 2021-2030.

In line with the policies of the Finnish Government's energy and climate strategy, a significant proportion of the emission reduction in the effort sharing sector will be implemented through an increase in the use of biofuels. It is estimated that about half of the raw material required in the production of biofuels would be domestic wood. Even if more trees were harvested for the increase in wood production, and the use for energy would only be a 'by-product', the planned increase in harvesting would reduce the carbon sink in Finland's forests so much that net emissions into the atmosphere will remain at approximately the present level through to 2030. This is taking place in spite of the decline in emissions in the emissions trading and effort sharing sectors. If the obligations set for the LULUCF sector require the maintenance of the present carbon sink level, Finland might have to compensate the reduction of the sink through other measures.

## Adapt and prepare

Reducing GHG emissions is the only sustainable solution for controlling climate change in the long term. Adaptation is required to reduce the risks linked to climate change and to utilise possible benefits. Preparations for change are needed in all sectors.

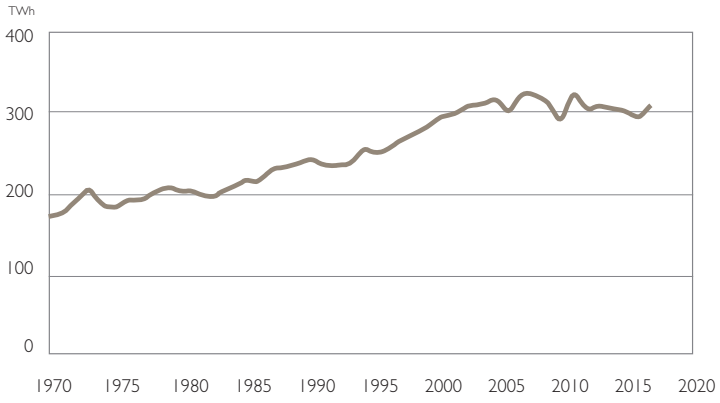
The European Environment Agency EEA published a report on the impacts of climate change and related vulnerability in 2017. According to the report, climate change affects also Finland in many ways. Climate change can already be clearly seen in Europe, and several climatic records have been broken in recent years. All in all, temperatures in Europe were about 1.5 degrees higher in 2006-2015 than they were before the industrial era.

Climate change will have significant impacts on nature, livelihoods, and the economy across Europe. In Finland especially Arctic species will suffer. Health risks are connected with the increase in hot spells, while the decreasing number of cold spells can reduce them in the long term. Increases in rainfall and river flows combined with rising water temperatures in the Baltic Sea increase the risk of eutrophication. On the other hand, Finland appears to be less vulnerable than many other areas in Europe. In the coming decades, changes in temperatures and rainfall are expected to remain within limits that make dramatic consequences unlikely. Higher temperatures can benefit Finland in the form of lower heating costs and a longer growing season. On the other hand, it could bring new pests to Finland, leading to increased risks of damages in agriculture and forestry.

Municipalities have a significant role in preparing for risks related to weather and the climate. Municipalities are affected by damages from extreme weather, such as torrential rain, storm winds and floods. These can cause significant impacts for local authorities and companies and their ability to function, causing for instance serious consequences for municipal finances and services.

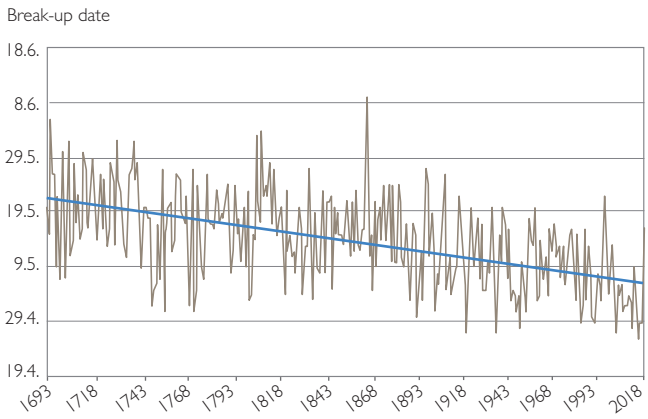
For now, risks involving weather and climate are being systematically assessed and managed in only a few Finnish municipalities. The risks can be reduced by taking them into consideration in matters such as land use planning and building infrastructure, such as drainage. Municipalities should also consider how they, their residents and businesses might be affected by risks that are realised in other locations. It is important to include the management of weather and climate risks in the municipality's normal development and planning.

**End use of energy in Finland 1970–2017**




End use of energy is the amount of energy that is left for the use of businesses, households, and other consumers once system loss and transformer loss are subtracted. Source: Statistics Finland. 2018.

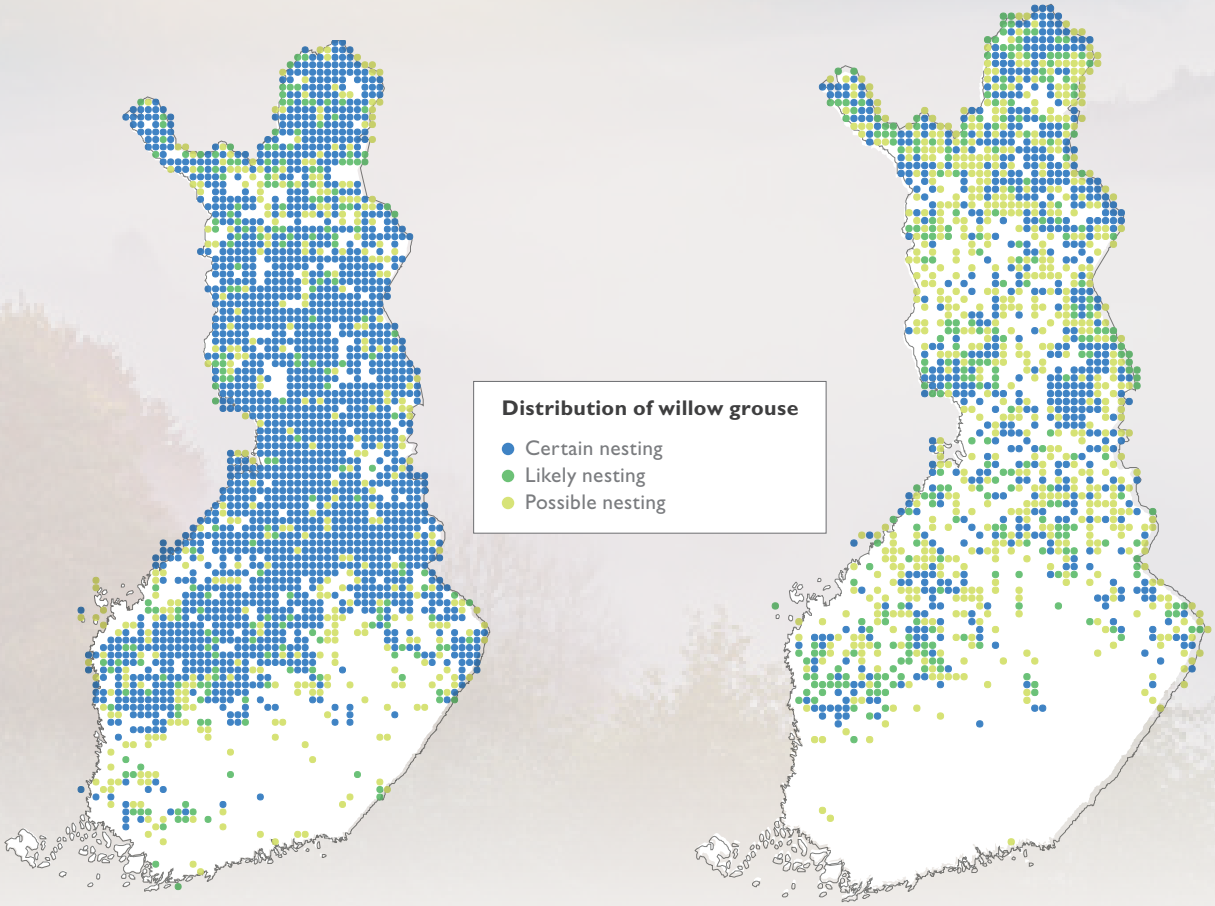
**Tornio River ice run 1693–2018**




The melting and break-up of winter ice on the Tornio River is starting on average two weeks earlier than just over 300 years ago. Source: SYKE. 2018.

## Distribution of willow grouse 1974–1989

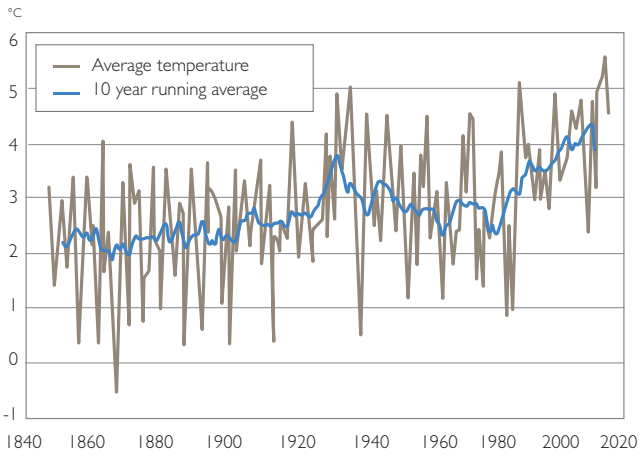
## Distribution of willow grouse 2006–2010




As the climate warms, northern species such as birds in the fell areas of Lapland have decreased. The distribution areas of northern species have also moved further north. For instance, a comparison of Finnish bird atlases from 1974-1989 and 2006–2010 shows that the central area of the habitat of the willow grouse has moved 145 kilometres north.

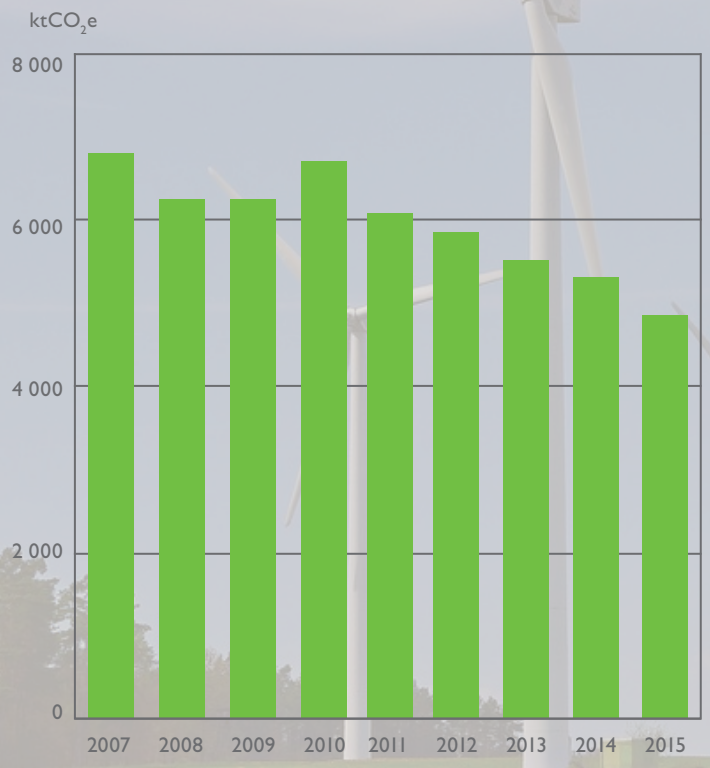
Source: Finnish bird atlases 1974–1979, 1986–1989 and 2006–2010.

## Average temperatures in Finland 1847–2016



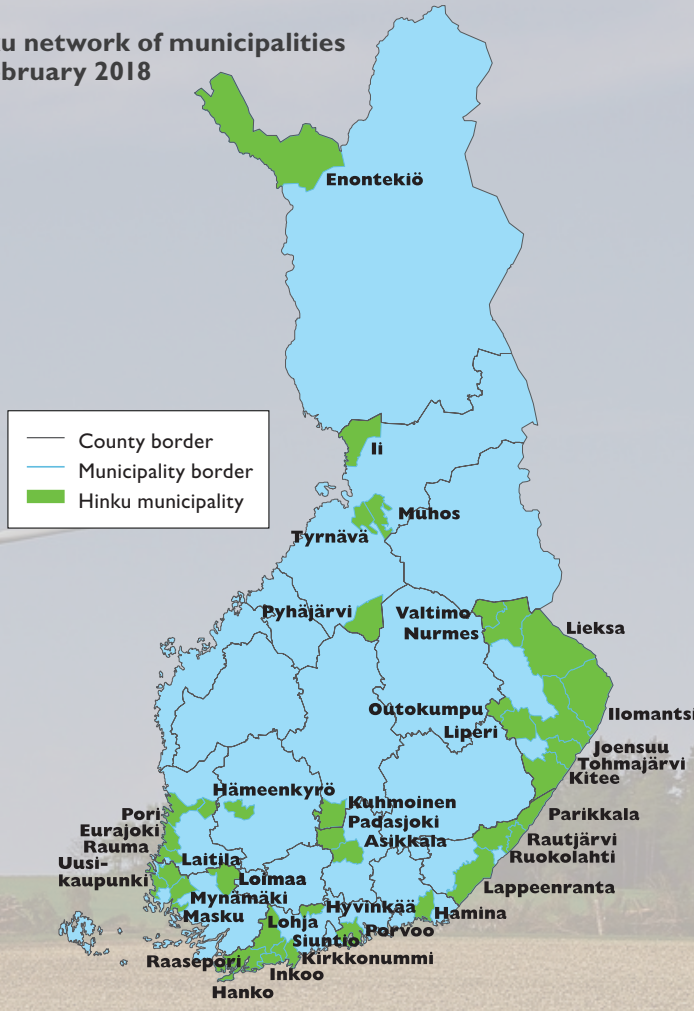

Average temperatures for Finland are based on data from four observation stations: Kaisaniemi in Helsinki, Kuopio airport, Kajaani airport and Oulunsalo Pellonpää. Source: Finnish Meteorological Institute. 2017.

**Emissions of Hinku municipalities 2007–2015**




Source: SYKE. 2018.

**Hinku network of municipalities in February 2018**




## Municipalities in the forefront of climate work

In Finland good results have been achieved in reducing greenhouse gas emissions in the so called Hinku network of municipalities aspiring to achieve carbon neutrality. The project Towards Carbon Neutral Municipalities began in 2008 in five municipalities. By February 2018 it had grown into the Hinku network with 39 municipalities. Municipalities in the network are committed to reducing their emissions by 80 percent by 2030 compared to the GHG emissions for 2007. In the network efforts are made to find suitable ways for each municipality to reduce emissions. Companies and researchers help the municipalities in tailoring their climate mitigation measures. The network has, among other things, brought new alternatives to municipal energy technology procurements. For example, in the joint procurement of solar power plants Kuntahankinnat Oy has asked for competitive bids for a framework contract that also includes funding for the power plants. This means that the municipality will not need to set aside an investment budget for the power plant, or to organise the competitive bidding. A similar model is also to be applied to other energy technologies. For instance, many municipalities are interested in smart street lighting and cars powered by electricity and biogas.

At the end of 2015, the combined emissions of the Hinku municipalities were nearly one third below the 2007 level. Emissions have been reduced especially with respect to electric heating, use of electricity by consumers, and by industry. Emissions from oil heating and district heating have also been cut significantly. The most important means of reducing emissions has been switching from fossil fuels to renewable energy.

The Hinku network has raised interest in other countries. Hinku municipalities, along with similar initiatives operating in many countries, represent global trailblazers who are showing that it is possible to significantly reduce greenhouse emissions while enjoying economic success.

**Sources**

Climate guide: **climateguide.fi**

Energia- ja ilmastostrategian vaikutusarviot: Yhteenvetoraportti. https://www.julkari.fi/handle/10024/131904

Hinku Forum: http://www.hinku-foorumi.fi/en-US

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